Unit title	Unit 2: Creating Systems to Manage Information
Guided learning hours	90
Number of lessons	45
Duration of lessons	2 hours

Key to learning opportunities			
IA	Internal assessment	**RS**	Revision session
GS	Guest speaker	**V**	Visit
IS	Independent study	**C**	Classroom activities directed by teacher

Lesson	Topic	Lesson type	Suggested activities	Resources
Learning aim A: Understand the purpose and structure of relational database management systems				
1	**A1 Relational database management systems**	IS C	• **Lead-in:** Introduce learners to the unit and to learning aim A. • **Tutor-led discussion:** Thought shower: where are databases used? Types of relational database management systems. • **Tutor presentation:** The purpose of a database, a database management system (DBMS) and an overview of relational DBMS, their use and support. • **Small-group activity:** Learners review a case study to identify which data needs to be stored and how the data would need to be used. • **Plenary:** Share feedback on the group activity. Summarise lesson and use Q&A to establish learners' understanding.	• Flipchart paper and pens for thought shower. • Tutor presentation and notes. • Case study materials.
2	**A1 Relational database management system**	IS C	• **Lead-in:** Recap on previous lesson, discuss real life example of related data (e.g. tutor/class, football league/teams). • **Tutor presentation:** database relations, including entity relationship, generic and semantic and relational data structures including relation, attribute, domain,	• Tutor presentation and notes.

Lesson	Topic	Lesson type	Suggested activities	Resources
	Relational data structures		tuple, degree, cardinality, relational database and the more common names for each, e.g. relation and table. • **Small-group activity:** Learners investigate various examples of data and discuss relationships between data items and how they might be organised. • **Individual practical exercise:** Learners create a table in an RDBMS and populate it with several records then create a related table. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Learner exercise materials. • Computers and database software for practical tasks.
3	**A1 Relational database management systems** Relational keys	IS C	• **Lead-in:** Recap on previous lesson, discuss how to find data. What is a key, what makes a good key? • **Tutor presentation:** Relational keys, including primary keys, candidate **keys, super keys and foreign keys** • **Tutor-led discussion:** The development cycle, creating tables and selecting keys. • **Individual practical exercise:** Learners to create two or more tables, select primary keys and foreign keys to create a relationship between tables.	• Tutor presentation and notes. • Learner exercise materials. • Computers and database software for practical tasks.

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	
4	**A1 Relational database management systems** Entity relationships and integrity constraints	IS C	• **Lead-in:** Recap on previous lesson, discuss data integrity. What is it, why is it important? • **Tutor presentation:** Entity relationships, including how to resolve one-to-one and one-to-many relationships and integrity • **Small-group activity:** Learners investigate small scenarios and define two entities, the relationship between them and resolving relationships as required. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes. • Learner exercise materials. • Selection of small (two or three entities) scenarios.
5	**A1 Relational Database Management Systems** Database relations	IS C	• **Lead-in:** Recap on previous lesson, discuss database relations and data models. What are they, why are they important? • **Tutor presentation:** Database relations, generic and semantic data models. • **Small-group activity:** Learners investigate a variety of scenarios (doctor's surgery, library, students/courses,	• Tutor presentation and notes. • Learner exercise materials.

Lesson	Topic	Lesson type	Suggested activities	Resources
			etc) and apply different data models to them and identify entities. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Selection of scenarios.
6	**A1 Relational Database Management Systems** Relational algebra	IS C	• **Lead-in:** Recap on previous lesson, discussion on extracting data, with some real-life examples. • **Tutor presentation:** Relational algebra, including join and select, union, intersect and notation symbols. • **Small-group activity:** Use examples of simple data sets and identify results of union, join, select and intersect options and discuss results. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes. • Learner exercise materials. • Sample database schema.
7	**A2 Manipulating data structures and data in relational databases** Updating, inserting, deletion retrieval of	IS C	• **Lead-in:** Recap on previous lesson, discussion on the requirements in terms of data manipulation. • **Tutor-led practical demonstration:** Manipulation of data and structures and use of SQL to define, modify and remove data and structures.	• Learner exercise materials. • Computers and database

Lesson	Topic	Lesson type	Suggested activities	Resources
	data for queries, reports		• **Individual practical activity:** Learners review a database schema and perform several actions using SQL to define, modify and remove data and structures. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	software for practical tasks.
8	**A2 Manipulating data structures and data in relational databases** Administration of users Security, integrity, recovery	IS C	• **Lead-in:** Recap on previous lesson, discussion on why security is important. • **Tutor-led practical demonstration:** User administration techniques and how to apply security settings. • **Small-group activity:** Learners review a scenario and define a policy for administration, security, integrity and recovery. • **Individual practical exercise:** Learners apply security, user admin and integrity/recovery procedures following a simple scenario. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Learner exercise materials. • Computers and database software for practical tasks.

Lesson	Topic	Lesson type	Suggested activities	Resources
9	**A3 Normalisation** Stages of normalisation	IS C	• **Lead-in**: Recap on previous lesson, discussion different way of representing data and their issues. • **Tutor presentation:** Introduction to normalisation, stages of normalisation. • **Small-group activity:** Learners attempt normalisation of data using a simple scenario. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes. • Simple normalisation scenario.
10	**A3 Normalisation** Anomalies – update, insertion, deletion	IS C	• **Lead-in:** Recap on previous lesson, normalisation quiz. • **Tutor presentation:** Data structure anomalies, update, insert and delete, and their relationship to normalisation. • **Individual practical exercise:** Learners attempt a normalisation of data using a more complex scenario. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes.

Lesson	Topic	Lesson type	Suggested activities	Resources
11-14	**Learning aim A assessment**	IA/IS	• **Lead-in:** Introduce the assessment detailing the main assessment criteria, deadline, and submission criteria. • **Assignment writing:** Using the authorised assignment, learners should complete all the tasks.	• Computers with internet access • Authorised assignment
Learning aim B: Design a relational database to meet client requirements				
15	**B1 Relational database design** Conceptual, logical and physical modelling and entity relationship modelling	IS C	• **Lead-in:** Introduction to the topic. Discussion on the importance of design and its relationship with software design. • **Tutor presentation:** Conceptual, logical and physical modelling of database design, defining mathematical relations and entity relationship modelling. • **Small-group activity:** Learners review a scenario and identify entities and draft an entity relationship diagram. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes.

Lesson	Topic	Lesson type	Suggested activities	Resources
16	**B1 Relational database design** Relational algebra	IS C	• **Lead-in:** Revision of relational algebra covered in topic A. • **Tutor presentation:** One-to-many, one-to-one, many-to-many, AND, OR, NOT, >. <. ≥, ≤ • **Small-group activity:** Learners investigate use of relational algebra following series of scenarios. **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes. • A variety of different scenarios from different sectors for learner activities (personal and business examples using a range of comparison and Boolean operators).
17	**B1 Relational database design**	IS C	• **Lead-in:** How do you choose the right software for an application?	• Tutor presentation and notes.

Lesson	Topic	Lesson type	Suggested activities	Resources
	RDMS and SQL software selection		• **Tutor presentation:** Types of database software and their features. • **Small-group activity:** Learner's research suitable software for a variety of different applications. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	
18	**B1 Relational database design** Application design	IS C	• **Lead-in:** Recap on previous lesson. Interface design – how to make an interface intuitive. • **Tutor presentation:** Interface and application design, concepts, and methods. • **Small-group activity:** Learners develop an interface design following a given scenario. • **Individual practical exercise:** Learners attempt to implement parts of the user interface and work in pairs to review their efforts. • **Plenary:** Share feedback on the practical activity. Summarise lesson and use Q&A to establish learners' understanding.	• Tutor presentation and notes. • Scenarios for learner activities. • Computers and database software for practical tasks.

Lesson	Topic	Lesson type	Suggested activities	Resources
19	**B1 Relational database design** Implementation and quality	IS C	• **Lead-in:** Recap on previous lesson. Discussion – ways to implement a database system. • **Tutor-led discussion:** Methods of assessing the quality, effectiveness, and appropriateness of a solution. • **Small-group activity:** Learners investigate some online databases (e.g. e-commerce site product search systems) to consider their quality and effectiveness and report back to the class. • **Tutor-led discussion:** Implementation techniques, benefits of different methods. • **Plenary:** Share feedback on the activity. Discuss the link between design and quality of the outcome. Summarise lesson and use Q&A to establish learners' understanding.	• Computers for practical tasks.
20	**B2 Design documentation** Client requirements Security and legal considerations	IS C	• **Lead-in:** Recap on previous lesson. Explain simple case study to be used for design practice. • **Tutor-led discussion:** How to understand a client's requirements. Discuss the case study requirements.	• Case study materials for learner activities.

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Small-group activity:** Learners discuss the case study and produce an outline requirement specification, and then report back to the class. • **Tutor-led discussion:** What legal issues apply to database design and development? What are the security requirements of the case study? • **Plenary:** Discussion about data privacy.	
21	**B2 Design documentation** Data structure designs Normalisation and entity relationship diagrams	IS C	• **Lead-in:** Recap on previous lesson • **Tutor presentation:** Revision on normalisation and explanation of entity relationship diagrams. • **Independent learning activity:** Learners take raw data (for the case study database used in previous lessons), normalise it and then create an entity relationship diagram. • **Tutor-led discussion:** Feedback on the activity. Discuss the correct way to normalise the data and draw the entity relationship diagram. • **Plenary:** Discussion: when might a one-to-one relationship be required?	• Tutor presentation and notes. • Case study raw data.

Lesson	Topic	Lesson type	Suggested activities	Resources
22	**B2 Design Documentation** Data structure designs Naming conventions and data dictionaries	IS C	• **Lead-in:** Recap on previous lesson. What makes a good field name? • **Tutor presentation:** The concept of naming conventions and the reasons behind them. • **Independent learning activity:** Learners create data dictionaries for the case study database. • **Tutor-led practical demonstration:** Creating a structure in the database software. See the link on how to create a database in Access in the resources column. • **Independent learning activity:** Learners create the structure in the database software. • **Plenary:** Feedback and Q&A on the practical activities.	• Tutor presentation and notes.
23	**B2 Design documentation** User interface design	IS C	• **Lead-in:** Recap on previous lesson. • **Tutor presentation:** Developing a user interface design. • **Independent learning activity:** Learners create a user interface design for the case study database. • **Plenary:** Feedback and Q&A on the practical activity.	• Tutor presentation and notes.

Lesson	Topic	Lesson type	Suggested activities	Resources
24	**B2 Design documentation** Extracting and presenting data	IS C	• **Lead-in:** Recap on previous lesson. What kind of information do you want to extract from a database? • **Tutor-led practical demonstration:** Design and create various types of queries and reports. • **Independent learning activity:** Learner's design and try out various simple queries and report on the case study database. • **Plenary:** Feedback and Q&A on the practical activity.	• Computers for practical tasks.
25	**B2 Design documentation** Design and use of test plans	IS C	• **Lead-in:** Recap on previous lesson. The importance of testing. • **Tutor presentation:** Design of test plans. • **Independent learning activity:** Learners create a test plan for a case study database. • **Plenary:** Feedback and Q&A on the practical activity.	• Computers for practical tasks.
26	**B3 Evaluation of Designs**	IS C	• **Lead-in:** Introduction to the topic. • **Tutor-led discussion:** Evaluation of the process of completing normalisation, creation of ERD and data dictionary. Comparison to actual database produced.	• Computers for practical tasks • Case study designs.

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Small-group activity:** Learners review their design for the case study database and consider how it might be improved. • **Tutor-led discussion:** Feedback from the activity, discuss how to ensure the design can fully cover the required functionality and requirements of users. • **Plenary:** Recap on design evaluation, Q & A to check learner understanding.	
Learning aim C: Develop a relational database to meet client requirements				
27	**C1 Producing a database solution**	IS C	• **Lead-in:** Introduction to the learning aim. Explain more complex case study (with full details of the required solution) to be used for this topic. • **Independent learning activity:** Learners create a design for the more complex case study including data structure and user interface. • **Tutor-led discussion:** Feedback on design decisions. • **Plenary:** What makes a good design? How can you be sure the design is right?	Case study for learner activities.
28	**C1 Producing a database solution**	IS C	• **Lead-in:** Recap on the project	• Computers for practical tasks.

Lesson	Topic	Lesson type	Suggested activities	Resources
	Creating, setting up and maintaining data tables. Creating links, relationships between data tables. Applying data validation rules		• **Tutor-led practical demonstration:** Recap on creating a database structure, creating links, adding data validation rules. • **Independent learning activity:** Learners set up the database structure based on their previously created design. • **Plenary:** Feedback and Q&A on the database set up activity.	
29	**C1 Producing a database solution** Populating the database	IS C	• **Lead-in:** In real life, where is raw data likely to come from? • **Tutor-led practical demonstration:** Converting and importing data. • **Independent learning activity:** Learners convert and import raw data to their database. • **Plenary:** Feedback and Q&A on the data import activity.	• Case study for learner activities. • Raw data. • Computers for practical tasks.
30	**C1 Producing a database solution** Generating outputs, user interface	IS C	• **Lead-in:** Recap on previous lesson and review of progress on the database development. • **Tutor-led practical demonstration:** Creating a user interface.	• Case study for learner activities.

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Independent learning activity:** Learners create a user interface for their database following the previously created design. • **Plenary:** Feedback and Q&A on the database set up activity. Discussion on the suitability of the user interface, does it meet requirements? It is sufficiently easy to use?	• Computers for practical tasks.
31	**C1 Producing a database solution** Automated functions	IS C	• **Lead-in:** What sort of functions are suitable for automation? • **Tutor-led practical demonstration:** Creating automated functions. • **Independent learning activity:** Learners create automated functions for their database • **Plenary:** Feedback and Q&A on the automated function activity, and the suitability of the functions included.	• Case study for learner activities. • Computers for practical tasks.
32	**C1 Producing a database solution** Devising and using SQL statements	IS C	• **Lead-in:** Recap on SQL and relational algebra. • **Tutor-led practical demonstration:** Using SQL statement to extract data.	• Case study for learner activities.

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Independent learning activity:** Learners develop SQL statement to extract data from their databases and modify it. • **Plenary:** Feedback and Q&A on the SQL activity, how useful is the data the SQL extracts from the database, does it meet the user requirements?	• Computers for practical tasks.
33	**C2 Testing and refining the database solution** Different types of testing selection Use of appropriate test data	IS C	• **Lead-in:** Recap on previous lesson. • **Tutor presentation:** Recap on types of testing, test plans and test data. • **Independent learning activity:** Learners create a test plan with test data for their case study database. • **Plenary:** Feedback on practical activity. Evaluation of the test plans, will they test the database sufficiently?	• Case study for learner activities. • Computers for practical tasks.
34	**C2 Testing and refining the database solution** Recording appropriate test documentation	IS C	• **Lead-in:** Recap on previous lesson. • **Independent learning activity:** Learners use previously created test plans to test their case study database. • **Plenary:** Feedback on practical activity.	• Case study for learner activities. • Computers for practical tasks.

Lesson	Topic	Lesson type	Suggested activities	Resources
35	**C2 Testing and refining the database solution** Using testing outcomes to improve and refine a database solution	IS C	• **Lead-in:** Recap on previous lesson. • **Tutor-led discussion:** Feedback from testing, how testing can help improve and refine a database. • **Independent learning activity:** Learners investigate improvements they can make to their database based on the testing completed. • **Tutor-led discussion:** how can we evaluate the case study database? Ways to judge the quality of the solution created. • **Plenary:** Review of the case study activity.	• Computers for practical tasks.
36	**C3 Evaluation of testing** **C4 Evaluation of the refined database solution**	IS C	• **Lead-in:** What makes a good database? • **Tutor-led discussion:** Evaluating the strengths and weaknesses of a database. • **Small-group activity:** Learners evaluate databases produced by other learners and identify strengths and weaknesses. • **Tutor-led discussion:** Has your database been tested enough. How can testing be made better? How much testing is enough?	• Learner database work

Lesson	Topic	Lesson type	Suggested activities	Resources
			• **Tutor-led discussion:** Feedback from the activity, learners discuss their evaluations, common themes identified.	
37-45	**Learning aims B & C assessment**	IA/IS	• **Lead-in:** Introduce the assessment detailing the main assessment criteria, deadline, and submission criteria. • **Assignment writing:** Using the authorised assignment, learners should complete all the tasks.	• Computers with internet access • Authorised assignment with CSV file